ASSESSING PHARMACY PRACTICE GAPS WITH PN THROUGH TECHNOLOGY

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Disclosures
I have no commercial relationships relevant to the topic being presented.

Presentation Summary
A survey of parenteral nutrition (PN) practices reported that most institutions (60.2%) dedicate a 0.6 full-time equivalent pharmacist to verify and review PN orders. Pharmacists and pharmacy technicians must conduct both a clinical and pharmaceutical review of PN orders, however adequate training programs to conduct this training rarely exist with the dwindling number of board-certified pharmacists in nutrition support and minimal education provided in university-based pharmacy education.

Learning Objectives
At the completion of this program, pharmacists will be able to:

1. Describe how to identify professional practice gaps for parenteral nutrition use.
2. Assess the competency of healthcare professionals involved in the parenteral nutrition process.
3. Summarize how online educational modules can be used to address professional practice gaps and competency remediation.

Key Takeaways
1. Reviewing your organization’s process for PN including prescribing, order review and verification, compounding, and administration can identify educational gaps for the healthcare professionals involved.
2. Institution of a PN order review and verification checklist specific to your organization as part of comprehensive education and training can increase pharmacy staff competence.

Self-Assessment Questions
1. Which of the following can identify educational gaps in regards to the parenteral nutrition process of prescribing, order review and verification, compounding, and administration?
   a. Voluntary reporting of errors.
   b. Transcription of original order.
   c. Verification of infusion rate.
   d. Application of label to the completed product.

2. Current recommendations advocate for pharmacy personnel involved in the review and verification of parenteral nutrition orders to demonstrate competency at least:
   b. Quarterly.
   c. Biannually.
   d. Annually.
3. Pharmacy personnel involvement and application of technology in parenteral nutrition has been shown to completely eliminate errors in which of the following categories?
   a. Prescription.
   b. Transcription.
   c. Preparation.
   d. Administration.

Answers
1. A – Voluntary reporting of errors in the parenteral nutrition process of prescribing, order review and verification, compounding, and administration are most likely to reveal educational gaps in various healthcare professionals.
2. D – In the latest PN safety consensus recommendations, pharmacists who review and verify PN orders should demonstrate competency at least annually as defined by the healthcare institution.
3. B – The use of a computerized provider order entry (CPOE) program that incorporates PN dosing with soft and hard stop recommendations can reduce prescribing errors and simultaneously eliminates the need for paper order transcription. An integrated CPOE program with an automated compounding device can also reduce transcription. A children’s hospital was able to incorporate thirty developmental processes, resulting in practices that were compliant with A.S.P.E.N. PN safety consensus recommendations. The frequency of PN medication errors over 7 years was 230 errors/84,503 PN prescriptions, or 0.27%. After categorized errors by steps in the PN process (prescribing, transcription, preparation, and administration), there were no transcription errors, and most (95%) errors occurred during PN administration.

References
Assessing Pharmacy Practice Gaps with PN through Technology

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Learning Objectives

Upon completion of this session, the learner will be able to:

1. Describe how to identify professional practice gaps for parenteral nutrition use
2. Assess the competency of healthcare professionals involved in the parenteral nutrition process
3. Summarize how online educational modules can be used to address professional practice gaps and competency remediation

How is PN safety measured at your facility?

- Patient safety or error event reporting (voluntary)
- Healthcare staff competency assessment
- PN ordering revisions within electronic medical record
- Policy & procedure revisions based upon best practices

ASPEN Safe Practices for Parenteral Nutrition

Special Report

Safe Practices for Parenteral Nutrition

Task Force for the Revision of Safe Practices for Parenteral Nutrition, Joe Marini, MD, DrPH, BCNSP, Chair; Todd Canada, PharmD, BCNSP, Deborah Johnson, MS, RN, CCRN, Karen Elkins, PharmD, BCNSP; Craig Petersen, MD, CCRNP; Gautam Rehka, PharmD; Torrence Fashion, MD, CNSP, and Peggy Guzina, MD, RN, CNSP

Approved by A.S.P.E.N. Board of Directors July 21, 2016

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ASPEN Parenteral Nutrition Safety Consensus Recommendations

Clinical Recommendations

A.S.P.E.N. Parenteral Nutrition Safety Consensus Recommendations

- Patient safety or error event reporting (voluntary)
- Healthcare staff competency assessment
- PN ordering revisions within electronic medical record
- Policy & procedure revisions based upon best practices

 Maduro, National President of the American Society for Parenteral and Enteral Nutrition; Bruce Johnson, MD, DrPH, BCNSP, Chair; Todd Canada, PharmD, BCNSP, Deborah Johnson, MS, RN, CCRN, Karen Elkins, PharmD, BCNSP; Craig Petersen, MD, CCRNP; Gautam Rehka, PharmD; Torrence Fashion, MD, CNSP, and the American Society for Parenteral and Enteral Nutrition
Initiating PN Event

• Incident of incompatible PN for ICU patient
  • Involved specialty amino acid (Hepatamine 8%) with large dose of calcium gluconate, but no additional phosphate added
  • Not filtered and same PN administered for the previous 3 days
  • Continued patient deterioration resulting in ICU admission
  • PN stopped & solution was clear at room temperature
  • Warmed to 37°C for 30 minutes with visible precipitation

• Review of PN orders from 1999 – 2001
  • 35 incompatible PN orders written, compounded & administered
  • Involved 2 physicians, 9 clinical pharmacy specialists, 19 staff pharmacists, 3 outsource facility pharmacists, 5 certified pharmacy technicians

Initial PN Gap Analysis Education

28 Pharmacists
Individually tested & remediated

Pharmacy Administrative Response to PN Gap Analysis from Error Reporting

Subject:
TPN incident #23476 – trace elements not crossed out on 11/4/12

Hi Todd,

Incident report #23476 brings to the point that pharmacists did not check premedication TPN orders. I want to bring to your attention that our floor pharmacists rarely have enough time to double-check premedication TPN orders. They have also been instructed not to close TPN change orders as an error precautionary measure.

2002 PN Errors (n = 32)

• Order entry problems
  • Wrong unit entered
  • mL instead of mEq
  • Wrong amino acids solution
  • TrophAmine for Travasol
  • Item added but not ordered
  • Additive omitted
  • Involved 18 different pharmacists

Patient Outcomes

• 4 errors that resulted in need for monitoring
  • KCl 100 instead of 60 mEq
  • NaCl 560 instead of 140 mEq
  • Insulin added instead of Pepcid
  • Altered PN order form

2000 PN Errors (n = 25)
PN Competency – Clinician vs. Compounder

**MD Anderson Nutrition Support Responsibilities**

1. Identify the patient's name, medical record number, and room location (if known).
2. Determine the nutrition support diet plan for the patient(s).
3. Communicate with the pharmacy regarding any changes or updates to the diet plan.
4. Review the nutrition support diet plan and provide feedback to the pharmacist.
5. Monitor the patient's progress and adjust the diet plan as needed.

**PN Competency Safety Assessment**

31 CN errors reported from 2013
- 56% involved operational pharmacist
- 13% involved prescribing pharmacist
- 32% involved nurse

- Most frequent PN errors related to
  - 32% wrong drug
  - 26% wrong dose
  - 3% wrong patient
  - 26% wrong rate
  - 10% wrong administration
  - 13% wrong timing

- 94% of PN errors reached patients
  - 48% causing harm
  - 59% requiring an intervention
  - 41% requiring additional treatments

**PN Resources Created**

- More PN Gap Analysis from Voluntary Error Reporting
  - 4.3/1000 PN error rate vs. published literature 15.6/1000
  - 63% of PN errors related to
    - 32% wrong drug
    - 26% wrong dose
    - 3% wrong patient
    - 26% wrong rate
    - 10% wrong administration
    - 13% wrong timing
  - 94% of PN errors reached patients
    - 48% causing harm
    - 59% requiring an intervention
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**PN Order Review and Verification Checklist**

- Verify PN order:
  - Patient name and medical record number
  - Type of order
  - Dose and route
  - Frequency
  - Duration

- Verify PN solution:
  - Type of order
  - Identification of drug, dose, and route
  - Frequency

- Verify PN order issues:
  - Compatibility of solutions
  - Patient-specific information

- Review PN order for completeness:
  - Verification of dose, rate, and timing
  - Verification of drug interactions
  - Verification of all required information

- Verify PN order for errors:
  - Verification of correct patient information
  - Verification of correct drug information
  - Verification of correct dose information
  - Verification of correct route information
  - Verification of correct timing information

- Verify PN order for administration:
  - Verification of correct administration route
  - Verification of correct administration time
  - Verification of correct administration location

- Verify PN order for patient-specific information:
  - Verification of correct patient information
  - Verification of correct drug information
  - Verification of correct dose information

- Verify PN order for drug interactions:
  - Verification of correct drug information
  - Verification of correct dose information
  - Verification of correct route information
Development of Formal Pharmacy Education

- Provided ACPE-accredited CE with pre- and post-test assessment of all inpatient pharmacy staff.

### Average Scores

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<th>Pre-test</th>
<th>Post-test</th>
<th>Difference</th>
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<tr>
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<td>73</td>
<td>92</td>
<td>+19%</td>
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**Why is Parenteral Nutrition (PN) Safety Important?**

**First Error:** The supplier placed bar code stickers on the pre-mixed PN bottle. The hospital pharmacy technician only scanned the bar code on the supply bottle, never the drug bottle, before dispensing the PN. The patient received the wrong PN.

**Second Error:** The medication technician mixed PN with a vial of electrolytes. The patient received an electrolyte solution instead of PN.

**Recommendations:**
- Always double-check the medications before administration.
- Ensure all bar code scanners are functional and calibrated regularly.
- Implement a protocol for double-checking medications before administration.

**Why is Parenteral Nutrition (PN) Safety Important?**

**Second Error:** The medication technician mixed PN with a vial of electrolytes. The patient received an electrolyte solution instead of PN.

**Recommendations:**
- Implement a protocol for double-checking medications before administration.
- Ensure all bar code scanners are functional and calibrated regularly.
- Always double-check the medications before administration.
Pre-CPOE PN Safety Implications

- Prospective, observational study in a large teaching hospital with a nutrition support team. 4730 prescriptions for PN reviewed and 74 errors observed
  - Transcription and preparation accounted for 64% of PN errors
  - 8% contributed to or resulted in temporary patient harm
  - 15.6 errors/1000 PN prescriptions

Post-CPOE PN Safety Implications

- Observational study in a 350-bed urban pediatric hospital, 84,503 prescriptions for PN reviewed and 230 errors observed
  - 9.1% contributed to or resulted in temporary patient harm
  - 2.7 errors/1000 PN prescriptions

References